

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 36-38, 42, 48, 49, 51-53, 57, 59, 60 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Publication No. 2003/0202468 to Cain et al in view of U.S. Patent No 7,281,057 to Cain.

Referring to claims 36, 51 and 59, Cain et al disclose a method of selecting a route for communicating information in a communication network, the method comprising:

Calculating (Figure 7, blocks 72 and 73) a connectivity metric (QoS metrics) for a plurality of links defining each of a plurality of routes that connect a start node (Figure 9, node 214) with an end node (Figure 9, node 215), each link of the plurality of links including a first node and a second node, wherein the first node is a first type of node selected from a first master node (Figure 9, nodes 221-223), a first slave node (Figure 9, nodes 211), and a first multiple network participant node (none), wherein the second node is a second type of node selected from a second master node (Figure 9, nodes 221-223), a second slave node (Figure 9, nodes 211), and a second multiple network participant node (none).

Determining (Figure 7, blocks 74 and 75) a total connectivity metric for each of the plurality of routes based on the calculated connectivity metric for the plurality of links defining each of the plurality of routes.

Selecting (Figure 7, block 76) a route in a communication network for communicating information between the start node and the end node from the plurality of routes based on the determined total connectivity. A plurality of potential routes between start node 214 and end node 215 is determined, and for each potential route, QoS metrics are calculated. Each route is determined by finding an adjacent cluster target node (ACTN) to reach the destination. As shown in Table 1 (Section 0048), QoS metrics for ACTN node selection include estimated link delay, available link capacity, etc. The QoS metrics for all routes is calculated and the route with the best QoS metrics is chosen. Refer to Sections 0054-0062.

Cain et al do not specifically disclose wherein the calculated connectivity metric for a link of the plurality of links is determined based on the first type of node and the second type of node.

Cain et al disclose in Table 1 (Section 0048) that available link capacity is the most important QoS parameter in determining the total QoS metric for a potential route. Cain in U.S. Patent No. 7,281,057 discloses that a cluster leader node of an adjacent cluster could also serve as a cluster target node (ACTN), which would be advantageous if the cluster leader node has high link capacities (Column 13, lines 34-40). Furthermore, Cain et al in U.S. Publication No. 2003/0202468 disclose in Figure 9 that a cluster leader node 226 serves as the ACTN in the route to destination node 215. So,

the QoS metrics is determined based on the first type of type and the second type of node, because if either type of node is a leader, then it will have higher link capacities and will be chosen as the ACTN. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include wherein the calculated connectivity metric for a link of the plurality of links is determined based on the first type of node and the second type of node. One would have been motivated to do so since a cluster leader has higher link capacities and can route packets faster and more efficiently if placed in the route to the destination.

Referring to claims 37, 38, 52, 53 and 60, Cain et al disclose wherein, if the first/second node is the first/second master node in a sub-network of the communication network and the second/first node is the second/first slave node in the sub-network, the connectivity metric is a number of slave nodes in the sub-network. The number of nodes controlled by a cluster leader affects the leader being chosen as the ACTN since according to Table 1 (Section 0048), the available link capacity is the most important QoS parameter in determining the ACTN. The more nodes a cluster leader has, the less link capacity it will have, which will decrease the leader's chance of being chosen as an ACTN in the route. Refer to Sections 0080 and 0084.

Referring to claims 42, 57 and 64, Cain et al disclose wherein determining the total connectivity metric of a route of the plurality of routes comprises identifying a maximum connectivity metric of the plurality of links defining the route. Based on the parameters of Table 1 (Section 0048), the QoS metrics for ACTN node selection is

calculated for each potential route. This involves calculating the path with the maximum and minimum connectivity metric. Refer to Sections 0054-0056.

Referring to claim 48, Cain et al disclose that the method further comprises communicating the calculated connectivity metric to a node of the communication network. The QoS metrics of all potential routes must be communicated to one another in order to compare them and find the best route, such as through HELLO messages. Refer to Sections 0057-0062 and 0079.

Referring to claim 49, Cain et al disclose that communicating the calculated connectivity metric comprises inserting the calculated connectivity metric into a routing protocol packet (HELLO messages). Nodes 211 broadcast and listen for HELLO messages, which are sent to and from other nodes 211 to communicate path metric information. Refer to Section 0079.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 39, 54 and 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Publication No. 2003/0202468 to Cain et al in view of U.S. Publication No. 2002/0142789 to Kuhl et al.

Cain et al do not disclose wherein the first multiple network participant node comprises a first master multiple network participant node and a first slave multiple

network participant node wherein the first master multiple network participant node participates in a sub-network of the communication network as a master node, and further wherein the first slave multiple network participant node does not participate in the communication network as a master node.

Kuhl et al disclose in Figure 1 a multiple network participant node 3 that acts as a master multiple network participant node to slave node 1 and slave node 2 and as a slave multiple network participant node to master node 4. Refer to Section 0013 and Section 0055, lines 1-5. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include wherein the first multiple network participant node comprises a first master multiple network participant node and a first slave multiple network participant node wherein the first master multiple network participant node participates in a sub-network of the communication network as a master node, and further wherein the first slave multiple network participant node does not participate in the communication network as a master node. One would have been motivated to do so since ad hoc networks include Participants in Multiple Piconets (PMP) nodes that are masters in one piconet but are slaves in another piconet.

5. Claim 50 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Publication No. 2003/0202468 to Cain et al in view of U.S. Publication No. 2005/0226265 to Takatori.

Cain et al disclose do not disclose wherein the calculated connectivity metric is inserted into the routing protocol packet in place of a hop number.

Takatori discloses in Figures 20 and 21 a method for determining potential paths between stations in a network. Packets, transmitted between stations which advertise the potential paths, indicate the path costs of paths instead of the hop count of paths. Refer to Sections 0104-0110. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include. One would have been motivated to do so in order to take into account other factors besides hop count when determining the optimal path.

Allowable Subject Matter

6. Claims 40, 41, 43-47, 55, 56, 58, 62, 63 and 65 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHRISTINE NG whose telephone number is (571)272-3124. The examiner can normally be reached on M-F; 8:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Firmin Backer can be reached on (571) 272-6703. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

C. Ng
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/FIRMIN BACKER/
Supervisory Patent Examiner, Art Unit 2616